

IN THE CLAIMS

The following is a complete list of the claims. This listing replaces all previous listings and versions of the claim.

Claims 1-17 (canceled)

Claim 18 (previously presented): A method of decoding a sequential stream of data for providing substantially random access to portions of an image at a plurality of predetermined resolutions, the stream including a non-redundant multiple resolution frequency domain representation of the image, the representation comprising one low frequency subband and a plurality of high frequency subbands arranged in levels, wherein each subband is divided into a plurality of tiles and each level represents frequency contributions between adjacent resolutions of the image, and wherein each tile represents a frequency contribution to a portion of the image at a predetermined resolution, said method including:

retrieving at most one pointer in the sequential stream for each set of tiles which correspond to substantially a same spatial portion of the image for each level to access a portion of the digital image.

Claim 19 (previously presented): The method as claimed in claim 18, wherein accessing the portion includes decoding a data address by the pointer.

Claim 20 (previously presented): The method as claimed in claim 18, wherein the sequential stream is a bitstream.

Claims 21-37 (canceled)

Claim 38 (previously presented): An apparatus for decoding a sequential stream of data for providing substantially random access to portions of an image at a plurality of predetermined resolutions, the stream including a non-redundant multiple resolution frequency domain representation of the image, the representation comprising one low frequency subband and a plurality of high frequency subbands arranged in levels, wherein each subband is divided into a plurality of tiles and each level represents frequency contributions between adjacent resolutions of the image, and wherein each tile represents a frequency contribution to a portion of the image at a predetermined resolution, said apparatus including:

means for retrieving at most one pointer in the sequential stream for each set of tiles which correspond to substantially a same spatial portion of the image for each level to access a portion of the digital image.

Claim 39 (previously presented): The apparatus as claimed in claim 38, wherein accessing the portion includes decoding a data address by the pointer.

Claim 40 (previously presented): The apparatus as claimed in claim 38, wherein the sequential stream is a bitstream.

Claims 41-57 (canceled)

Claim 58 (previously presented): A computer program product comprising a computer readable medium having recorded thereon a computer program for decoding a sequential stream of data for providing substantially random access to portions of an image at a plurality of predetermined resolutions, the stream including a non-redundant multiple resolution frequency domain representation of the image, the representation comprising one low frequency subband and a plurality of high frequency subbands arranged in levels, wherein each subband is divided into a plurality of tiles and each level represents frequency contributions between adjacent resolutions of the image, and wherein each tile represents a frequency contribution to a portion of the image at a predetermined resolution, said computer program product including:

code for a retrieval step, of retrieving at most one pointer in the sequential stream for each set of tiles which correspond to substantially a same spatial portion of the image for each level to access a portion of the digital image.

Claim 59 (previously presented): The computer program product claimed in claim 58, wherein accessing the portion includes decoding a data address by the pointer.

Claim 60 (previously presented): The computer program product as claimed in claim 58, wherein the sequential stream is a bitstream.

Claims 61-87 (canceled)

Claim 88 (previously presented): A method of decoding a bitstream, said bitstream comprising a non-redundant hierarchical code, having one low frequency subband and

a plurality of high frequency subbands arranged in levels, which levels combine to represent multiple resolutions of the image, and each subband is divided into a plurality of tiles which are entropy encoded, said method comprising the steps of:

retrieving from the bitstream those entropy encoded tiles representing substantially the same predetermined spatial portion of the image from a number of contiguous levels of entropy encoded tiles representing a predetermined resolution of the multiple resolutions of the digital image, wherein at least two entropy coded tiles from different the subbands which represent substantially the same predetermined spatial portion of the image are arranged contiguously in the bitstream;

entropy decoding each tile;

grouping the tiles into a plurality of subbands; and

inverse linear transforming the grouped subbands to produce the predetermined portion of the digital image at the predetermined resolution.

Claim 89 (previously presented): An apparatus for decoding a bitstream, the bitstream comprising a non-redundant hierarchical code, having one low frequency subband and a plurality of high frequency subbands arranged in levels, which levels combine to represent multiple resolutions of the image, and each subband is divided into a plurality of tiles which are entropy encoded, said apparatus comprising:

means for retrieving from the bitstream those entropy encoded tiles representing substantially the same predetermined portion of the image from a number of contiguous levels of entropy encoded tiles representing a predetermined resolution of the multiple resolutions of the digital image, wherein at least two entropy coded tiles from different

subbands which represent substantially the same predetermined spatial portion of the image are arranged contiguously in the bitstream;

means for entropy decoding each tile;

means for grouping the tiles into a plurality of subbands; and

means for inverse linear transforming the grouped subbands to produce the predetermined portion of the digital image at the predetermined resolution.

Claim 90 (previously presented): A computer readable medium comprising a computer program for decoding a bitstream, the bitstream comprising a non-redundant hierarchical code, having one low frequency subband and a plurality of high frequency subbands arranged in levels, which levels combine to represent multiple resolutions of the image, and each subband is divided into a plurality of tiles which are entropy encoded, said computer program comprising:

code for a retrieval step, of retrieving from the bitstream those entropy encoded tiles representing substantially the same predetermined portion of the image from a number of contiguous levels of entropy encoded tiles representing a predetermined resolution of the multiple resolutions of the digital image, wherein at least two entropy coded tiles from different subbands which represent substantially the same predetermined spatial portion of the image are arranged contiguously in the bitstream;

code for an entropy decoding step, of entropy decoding each tile;

code for a grouping step, of grouping the tiles into a plurality of subbands; and

code for a transforming step, of inverse linear transforming the grouped subbands to produce the predetermined portion of the digital image at the predetermined resolution.

Claim 91 (new): A method of decoding a portion of an image from a bitstream, the bitstream being generated from a plurality of frequency subbands created by wavelet transforming a digital image, each of the subbands being divided into a plurality of tiles, each of the tiles being entropy encoded and arranged so that the entropy-encoded tiles representing substantially a same part of the image are arranged contiguously in the bitstream for at least one wavelet transform level, said method comprising the steps of:

- selecting the portion of the image at a selected resolution;
- accessing the entropy-encoded tiles of the bitstream corresponding to the selected resolution and selected portion of the image; and
- decoding the image portion using the accessed entropy-encoded tiles.

Claim 92 (new): An apparatus for decoding a portion of an image from a bitstream, the bitstream being generated from a plurality of frequency subbands created by wavelet transforming a digital image, each of the subbands being divided into a plurality of tiles, each of the tiles being entropy encoded and arranged so that the entropy-encoded tiles representing substantially a same part of the image are arranged contiguously in the bitstream for at least one wavelet transform level, said apparatus comprising:

- means for selecting the portion of the image at a selected resolution;

means for accessing the entropy-encoded tiles of the bitstream
corresponding to the selected resolution and selected portion of the image; and
means for decoding the image portion using the accessed
entropy-encoded tiles.

Claim 93 (new): A computer program product comprising machine-readable
program code recorded on a machine-readable recording medium, for controlling the operation of
a data processing apparatus on which the program code executes to perform a method of
decoding a portion of an image from a bitstream, the bitstream being generated from a plurality
of frequency subbands created by wavelet transforming a digital image, each of the subbands
being divided into a plurality of tiles, each of the tiles being entropy encoded and arranged so that
the entropy-encoded tiles representing substantially a same part of the image are arranged
contiguously in the bitstream for at least one wavelet transform level, said method comprising the
steps of:

selecting the portion of the image at a selected resolution;
accessing the entropy-encoded tiles of the bitstream corresponding to
the selected resolution and selected portion of the image; and
decoding the image portion using the accessed entropy-encoded tiles.

Claim 94 (new): A system for decoding a portion of an image from a
bitstream, said system comprising:

a storage unit for storing the bitstream, wherein the bitstream is
generated from a plurality of frequency subbands created by wavelet transforming a digital

image, each of the subbands being divided into a plurality of tiles, each of the tiles being entropy encoded and arranged so that the entropy-encoded tiles representing substantially a same part of the image are arranged contiguously in the bitstream for at least one wavelet transform level; and

a processor in communication with said storage unit and adapted to perform a method of decoding the portion of the image from the bitstream, the method comprising the steps of:

receiving a selection of the portion of the image and a selected resolution;

accessing the entropy-encoded tiles of the bitstream corresponding to the selected resolution and selected portion of the image; and

decoding the image portion using the accessed entropy-encoded tiles.